Comparison of Lip Prints, Rugae Pattern and Tongue Prints among Karnataka, Kerala and Tamil Nadu Population – A Short Study

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Abstract:

- **Aim**
  1. To compare the lip print, rugae pattern, & tongue print among three different population groups.
  2. To study the predominant type of lip, rugae and tongue patterns in individual group of population.
  3. To evaluate the efficacy of three parameters in Sex determination & population subtyping.

- **Materials and Method**
  The study included 90 subjects 30 Karnataka, 30 Kerala and 30 Tamil nadu subjects. Each group consisted of 15 males & 15 females in the age group of 18 to 30 years. Each individuals lip prints, palatal rugae, & tongue prints were studied using classifications given by Tsuchihashi, Lysell and Stefanescu et al. respectively and the results obtained were stastically analysed using chi square test and the P value less than 0.05 were considered significant.

- **Results**
  Type 3 lip print was found to be the most predominant among males and Type 1 in females in all the three populations. The major rugae shape among males was wavy and in females it was straight in all the three population. The U- shaped tongue was predominant among males and V- shaped among females and the longitudinal grooves showed no significant difference among males and females and between the states.

- **Conclusion**
  In the present study, we have made an attempt to study the lip prints, rugae pattern and tongue prints among three different population groups of India. Further studies with larger sample size are needed to overcome the shortcomings of the study.

Keywords:- Forensic Odontology, Chelioscopy, Palataloscopy, Tongue Prints.
Hence, the aim of this study is to find out the predominant type of lip print, Rugae pattern and Tongue print among males and females in Karnataka, Kerala, and Tamil nadu population and to find out the efficacy of three parameters in sex determination & population sub typing.

The Aim and Objective of this prospective study is:

- To compare the lip print, rugae pattern, & tongue print among three different population groups.
- To study the predominant type of each pattern in individual group of population.
- To evaluate the efficacy of three parameters in Sex determination & population sub typing

II. MATERIALS AND METHODS

The study sample included a total of 90 students studying in A.J. Institute of Dental and Medical Sciences, Mangalore- Karnataka, Where the study population was divided into three groups based on their state of nativity. Each group comprising of 30 subjects 15 males and 15 females from Karnataka, Kerala and Tamil nadu subjects between the age group of 18 to 30 years. Informed verbal consent was taken from each of the students.

- Exclusion Criteria
  - Students with braces and ulcers in the lips & tongue
  - Students with abnormalities of lips, palate and tongue and
  - With bony and soft tissue protuberances, deformity, trauma and active lesions, were excluded

- Recording the lip Prints
  The materials used for recording the lip prints were bright maroon colored lipstick, transparent cellophane tape, white chart paper, magnifying lens, and scissors. (Fig 1)

  Lips of the study subjects were cleaned, and then the lipstick was applied all over the lips. The impression of the lips was traced by applying a rectangular piece of cellophane tape over the lips of the subjects. Then the lip impression was transferred to the white chart paper and then visualized using the magnifying lens. (Fig 2)

- Examination of the Lip Prints
  The lip prints were analysed using the classification proposed by Tsuchihashias
  - Type 1: Clear-cut vertical grooves that run across the entire lips
  - Type 1’: Similar to Type 1, but do not cover the entire lip
  - Type 2: Branched grooves
  - Type 3: Intersected grooves
  - Type 4: Reticular grooves
  - Type 5: Grooves do not fall into any of the above categories

- Recording the Rugae Pattern
  The materials used for recording the rugae patterns were Alginate impression material, Maxillary impression trays, Dental stone, Plaster of paris, Graphite pencil and Metal scale. (Fig 3)

  Alginate impressions of the maxillary arch were made and casts were poured using dental stone. Plaster base was prepared for the casts and followed by tracing the rugae pattern using graphite pencil. (Fig 4)

- Examining the Rugae Pattern
  The rugae patterns were assessed using the classification proposed by Thomas & Kotze
  - Curved: Crescent shaped and curved gently
  - Wavy: Slight curve at the origin or termination of curved rugae
  - Straight: Run directly from their origin to termination

- Recording the Tongue Prints
  Subjects were asked to protrude their tongue and the DSLR camera was used to capture the images of the tongue. The shape of the tongue was examined from the corner of the mouth to the tip of the tongue. The tongue shape and the longitudinal grooves were categorized using the classification proposed by Stefanescu et al

- Examination of Tongue Prints
  - Based on shape
    - U shaped
    - V shaped
  - Based on the Grooves
    - Superficial
    - Deep

III. STATISTICAL ANALYSIS

The observed data was entered in the MS excel worksheet and the statistical analysis was done using Pearson's chi square test and the statistical software SPSS version 17. P value less than 0.05 was considered significant.

IV. RESULTS

- Lip Prints
  We observed that all lip print pattern was unique and no two individuals had the same pattern. In Karnataka Type 2 lip print pattern was observed to be predominant followed by Type 3. In Kerala Type 3 was predominant followed by Type 2 and in Tamil nadu Type3 followed by Type 1. (Fig 7 & 8)

  As a whole in all the three populations males demonstrated principally of Type 3 and majority of females showed Type 2. The stastical association of lip print patterns among the Karnataka, Kerala and Tamil nadu population revealed no significant difference.
- **Rugae Pattern**

  By the above study we observed that the rugae pattern in each individuals were distinct. The predominant rugae pattern among males in all the three states were found to be wavy pattern followed by curved and in female’s straight pattern was predominant. (Fig 9 & 10). The interstate statistical association was insignificant.

- **Tongue Prints**

  We observed that the predominant tongue shape among males in all the three states was found to be U shape and in females was V shape. No significant difference was observed in the longitudinal grooves among males & females.

  On correlating the lip prints, palatal rugae, and tongue prints by Pearson’s Chi-square test showed no statistical significance.
Fig 7 & 8: Distribution of Lip Print Pattern among Males and Females in Karnataka, Kerala & Tamil Nadu Subjects

Fig 9 & 10: Distribution of Rugae Pattern among Males and Females in Karnataka, Kerala & Tamil Nadu Subjects

Fig 11 & 12: Distribution of Tongue Shape among Males and Females in Karnataka, Kerala & Tamil Nadu Subjects

Fig 13 & 14: Distribution of Tongue Grooves among Males and Females in Karnataka, Kerala & Tamil Nadu Subjects
V. DISCUSSION

Mouth allows numerous possibilities that help in forensic identification. Dental and the supporting structures open numerous ways for the positive identification of victims from disasters, crime scenes and deceased persons.[8] The uniqueness of these structures makes them the potential parameters for forensic identification the dental records and DNA profiling plays a major role. Compilation of data from other parameters noticeably cheiloscopy, rugoscopy and recently tongue prints are also capable of playing a major role in criminal investigations where they serve as adjuvant in person identification, sex determination and population sub typing.[9, 10]

The importance of cheiloscopy is linked to the information that they develop at 6th month of intra uterine life, they are permanent and unique which are unchangeable after death. Palatal rugae pattern are stable, resistant to fracture and are believed to be precise for racial groups facilitation and the population recognition.[11] Tongue prints are found to be as unique as finger prints; moreover they are well protected from the external environment which proves them to be useful in forensic identification when used in conjunction with cheiloscopy and rugoscopy.[12]

In the literature, a number of studies have been done elaborately on lip prints, palatal rugae and few on tongue prints for sex and population identification individually. There are no studies that compared lip print, palatal rugae and tongue prints between three populations.

Hence, in the present study an attempt has been made to compare the lip prints, rugae patterns and tongue prints in subjects from three different parts of India (Karnataka, Kerala and Tamil nadu).

In the present study, the predominant lip print pattern among males was found to be Type 3 and in females it was Type 2. These results were in accordance to Hunasgi et al and Govindkar et al. Among the Karnataka population Type 2 was found to be predominant followed by Type 3. This was in accordance to Hunasgi et al and in contrast to the study done by Verghese et al who has found Type 4 as the predominant pattern among subjects from south Karnataka. [13] Among the kerala subjects Type 3 was predominant followed by Type 2. This was in contrast to Hunsagi et al who has reported Type 2 to be the principle pattern in kerala population. [14] Among the Tamil nadu subjects the predominant pattern was Type 3 followed by Type 1 this finding was in accordance with Sivapadhasundaram and Saraswathi et al.[15] In our study statistical association of all lip print patterns among Karnataka, Kerala and Tamil nadu population revealed no significant difference.

The predominant rugae pattern among males in all the three states were found to be wavy pattern followed by curved and in females straight pattern was predominant. These results were in accordance with Hunasgi et al. [14] No significant difference was observed between the states.

The principle tongue shape among males in all the three states was found to be U shape and in females was V shape. This finding was in accordance with Jedy et al. [16] There was no significant difference in the longitudinal grooves and interstate comparison among the study subjects

VI. CONCLUSION

In our study we have made an attempt to compare lip prints, rugae pattern, and tongue prints among three population groups in India. Subtle difference in different studies may be attributed to smaller sample size. Further studies with larger sample size are needed which will definitely prove that the “Lip speak the untold, Rugae see the unseen, Tongue unleash the truth”.

REFERENCES


